

Thesis Title	Small Industrial Scale Cultivation of <i>Spirulina platensis</i> Using Sa-Paper Pulping Wastewater		
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Abstract

The purpose of this research was to cultivate Kleow Thong Alga (*Spirulina platensis*) in the laboratory and on a small industrial scale, by using Sa-paper pulping wastewater.

On the laboratory scale, *Spirulina platensis* was cultivated using Sa-paper pulping wastewater at the concentrations of 0.5, 1, 2, 4, 6, 8 and 10 percent with added some chemical reagents (g/l) of NaHCO_3 8.5 , NaNO_3 1.5 , K_2HPO_4 0.5 and fertilizer (N:P:K 16:16:16) 0.6 and 10 percent inoculum. The volume of the medium was 500 ml and pH 10 ± 1 . Cultivations were carried out for 9 days in laboratory and field conditions. The maximum growth and cell productivity of *S. platensis* were obtained in 4 and 6 percent of Sa-paper wastewater in laboratory and field condition, respectively. The cell productivity were 2618.33×10^2 and 3718.33×10^2 cells/ml, respectively.

On the small industrial scale, *S. platensis* was cultivated using 2 types of containers with different circulation systems for nutrients. Container type I was cylindrical, 1.6 meter in diameter, 0.60 meter in height, 640 litre in capacity and the circulation system involved the movement of a metal plate in the center of the container. Container type II was square, 1.19 meter in length, 1.19 meter in width, 0.06 meter in height,

850 liter in capacity and the circulation system involved the movement of twin blowers. The concentration of nutrients and inoculums for cultivation of *S. platensis* in both types of containers were the same as the experiments for laboratory scale, but the total volume in the containers were 400 litres. Batch culture and semicontinuous culture were used in these experiments. Semicontinuous culture showed better performance. For cylindrical container, 881.3 gm of fresh-weight or 82.3 gm of dry-weight was obtained in 8 harvests and the maximum productivity of cells was 1083×10^2 cells/ml. For square container, 175.9 gm of fresh-weight or 16.5 gm of dry-weight was obtained in 2 harvests and the maximum productivity of cells was 1007×10^2 cells/ml. The protein contents of and the algae cultivated in Sa-paper wastewater and Zarrouk medium were 54 and 49.85 percent of dry weight, respectively. The biological oxygen demand (BOD_5) of the wastewaters were reduced by 89.58 percent in cylindrical container and 66.67 percent in square container.